

© Health Research and Education Trust

DOI: 10.1111/j.1475-6773.2011.01308.x

SPECIAL ISSUE: BRIDGING THE GAP BETWEEN RESEARCH AND HEALTH POLICY-INSIGHTS FROM ROBERT WOOD JOHNSON FOUNDATION CLINICAL SCHOLARS PROGRAM

Nonfinancial Barriers and Access to Care for U.S. Adults

Jeffrey T. Kullgren, Catherine G. McLaughlin, Nandita Mitra, and Katrina Armstrong

Objective. To identify prevalences and predictors of nonfinancial barriers that lead to unmet need or delayed care among U.S. adults.

Data Source. 2007 Health Tracking Household Survey.

Study Design. Reasons for unmet need or delayed care in the previous 12 months were assigned to one of five dimensions in the Pechansky and Thomas model of access to care. Prevalences of barriers in each nonfinancial dimension were estimated for all adults and for adults with affordability barriers. Multivariable logistic regression models were used to estimate associations between individual, household, and insurance characteristics and barriers in each access dimension.

Principal Findings. Eighteen percent of U.S. adults experienced affordability barriers and 21 percent experienced nonfinancial barriers that led to unmet need or delayed care. Two-thirds of adults with affordability barriers also reported nonfinancial barriers. Young adults, women, individuals with lower incomes, parents, and persons with at least one chronic illness had higher adjusted prevalences of nonfinancial barriers.

Conclusions. Nonfinancial barriers are common reasons for unmet need or delayed care among U.S. adults and frequently coincide with affordability barriers. Failure to address nonfinancial barriers may limit the impact of policies that seek to expand access by improving the affordability of health care.

Key Words. Access to care, nonfinancial barriers, health reform

The recently enacted Patient Protection and Affordable Care Act (PPACA) seeks to increase access to health care for U.S. adults by improving the affordability of health services (Patient Protection and Affordable Care Act 2010). To achieve this goal, the law requires private health insurance plans to allow young adults to remain as dependents on their parents' plans and eliminate cost-sharing for evidence-based clinical preventive services. It will also

expand eligibility for Medicaid and provide lower income individuals with subsidies for health insurance premiums and cost-sharing.

While the affordability of health care has long been recognized as a central element of access, many patients may face barriers that extend beyond their ability to pay for services (Ahmed et al. 2001; Ngo-Metzger et al. 2003; Barr and Wanat 2005; Fairbrother et al. 2005; Grol, Giesen, and van Uden 2006; Pathman, Ricketts, and Konrad 2006; Yang et al. 2006; Devoe et al. 2007; Probst et al. 2007; Clemans-Cope et al. 2008; Colwill, Cultice, and Kruse 2008; Pitts et al. 2010). These nonfinancial barriers have significant implications for the implementation of PPACA. For example, the identification of and development of plans to address common nonfinancial barriers—particularly those that co-exist with problems affording care—could maximize the likelihood that substantial investments in improving the affordability of care will translate into true gains in access. On the other hand, policy makers' inattention to prevalent nonfinancial barriers could potentially lead to adverse consequences. Reductions in only affordability-related access barriers could perpetuate—if not exacerbate—access disparities if certain groups disproportionately experience nonfinancial barriers. Public support for health reform could wane among individuals who are required to purchase health insurance but are unable to effectively access care due to remaining nonfinancial barriers.

Although nonfinancial barriers have important ramifications for the success of PPACA and health services researchers have long recognized their conceptual importance (Andersen and Newman 1973; Aday and Andersen 1974; Aday 1975; Pechansky and Thomas 1981; Thomas and Pechansky 1984; Friedman 1994; Andersen 1995; Gold 1998; McLaughlin and Wyszewianski 2002), there has not been an analysis of patient-reported data on the current extent of these barriers that policy makers would need in order to reduce them. In this study, we sought to address this need by estimating the prevalence of nonfinancial barriers that lead to unmet need or delayed

Address correspondence to Jeffrey T. Kullgren, M.D., M.S., M.P.H., Robert Wood Johnson Foundation Clinical Scholars, Philadelphia Veterans Affairs Medical Center, University of Pennsylvania, 1303B Blockley Hall, 423 Guardian Drive, Philadelphia, PA 19104; e-mail: kullgren@mail.med.upenn.edu. Jeffrey T. Kullgren, M.D., M.S., M.P.H., and Katrina Armstrong, M.D., M.S.C.E., are with the Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia, PA. Catherine G. McLaughlin, Ph.D., is with Mathematica Policy Research, Inc., and the Department of Health Management and Policy, University of Michigan School of Public Health, Ann Arbor, MI. Nandita Mitra, Ph.D., is with the Department of Biostatistics and Epidemiology, University of Pennsylvania School of Medicine, Philadelphia, PA. Katrina Armstrong, M.D., M.S.C.E., is with the Abramson Cancer Center and the Division of General Internal Medicine, University of Pennsylvania School of Medicine, Philadelphia, PA.

care among U.S. adults, assessing how frequently adults with affordability barriers that lead to unmet need or delayed care also experience nonfinancial barriers, and identifying groups of adults who most frequently face nonfinancial barriers that lead to unmet need or delayed care.

METHODS

Data Source

We conducted a cross-sectional analysis of data from the 2007 Health Tracking Household Survey (HTHS) Restricted Use File. The 2007 HTHS was conducted between April 2007 and January 2008 by the Center for Studying Health System Change with funding from the Robert Wood Johnson Foundation and is the successor to the Community Tracking Study Household Surveys that were conducted periodically between 1996 and 2003. The 2007 HTHS used random digit dialing to collect data by telephone from 17,797 people in 9,407 households in the contiguous United States. The survey was administered in both English and Spanish and the household response rate was 47.2 percent (2009).

In the 2007 HTHS, one adult in each randomly selected household provided selected data such as household income, employment status, insurance coverage, and general health status for all family members. Each adult in each sampled household then completed a set of survey questions about his or her own access to health care, chronic health conditions, and other information that could not be collected reliably by proxy. In this part of the survey, each adult respondent was asked, "During the past 12 months, was there any time when you didn't get the medical care you needed?" Each adult respondent was also asked, "Was there any time during the past 12 months when you put off or postponed getting medical care you thought you needed?" The 15,197 adults who completed these questions comprised the analytic sample for this study.

All adult respondents who reported either unmet medical need or delayed care were asked, "Did you not get the medical care you needed or have delays getting medical care you needed for any of the following reasons?" They could select from a list of prespecified reasons or provide additional reasons that were not a part of the prespecified list. Respondents could select as many reasons for their unmet need or delayed care as were applicable and were not asked to ascribe primacy to any of the reasons or rank their relative importance.

Classification of Access Barriers

We assigned reasons for unmet need or delayed care in the previous 12 months to one primary dimension in the Penchansky and Thomas model of access to care (Penchansky and Thomas 1981; Thomas and Penchansky 1984; Kullgren and McLaughlin 2010). In the Penchansky and Thomas framework, access to health care consists of five distinct dimensions: *affordability*, *accommodation*, *availability*, *accessibility*, and *acceptability*. *Affordability* is the relationship of prices of services to patients' income, ability to pay, and existing health insurance. *Accommodation* is the relationship between the manner in which the supply resources are organized to accept patients as well as the patients' perceptions of the appropriateness of these systems (e.g., appointment systems and hours of operation). *Availability* is the relationship of the volume of existing services and resources to patients' volume and types of needs (e.g., the adequacy of the supply of clinicians, clinical facilities, and specialized programs). *Accessibility* is the relationship between the location of services and the location of patients (e.g., transportation resources and travel time). *Acceptability* is the relationship between patients' attitudes about personal and practice characteristics of clinicians and facilities to actual characteristics of existing clinicians and facilities (e.g., clinician gender or ethnicity, clinic neighborhood or type), as well as clinician attitudes about acceptable personal characteristics of patients. For this study, we also created a measure where all *accommodation*, *availability*, *accessibility*, and *acceptability* reasons for unmet need or delayed care were classified as a *nonfinancial* barrier.

Reasons for unmet need or delayed care that did not describe a true access barrier were not assigned to any Penchansky and Thomas access dimension. For example, "other problems related to the health system" and instances when the respondents "didn't think the problem was serious enough" were not assigned to an access dimension. Overall, there were seven reasons that were not assigned to an access dimension.¹ All assignments of reasons for unmet need or delayed care to one primary access dimension—or to no dimension at all—were agreed upon by all authors.

Statistical Analysis

We constructed nationally representative estimates by applying sample weights provided by the Center for Studying Health System Change that account for the sampling design and survey nonresponse. Using these

weighted responses, we estimated the raw proportions (i.e., unadjusted for any confounding factors that could influence the presence of a barrier) and 95 percent confidence intervals of U.S. adults who in the last 12 months had barriers that led to unmet need or delayed care in each of the five access dimensions and in any *nonfinancial* dimension. Next, we estimated the raw proportion and 95 percent confidence interval of U.S. adults with *affordability* barriers that led to unmet need or delayed care who also had *nonfinancial* barriers that led to unmet need or delayed care.

Finally, we used multivariable logistic regression to estimate independent associations between an a priori set of predisposing, enabling, and need-related factors related to health care utilization and barriers in each dimension that led to unmet need or delayed care in the previous 12 months (Andersen and Newman 1973). The main predictor variables were age, gender, race/ethnicity, household income, employment status, parental status, health insurance coverage, chronic illness, and health status. Other model covariates included educational attainment, marital status, U.S. citizenship, U.S. Census region, county metropolitan statistical area (MSA) category, and county Primary Care Health Professional Shortage Area (HPSA) status.

All predictor variables were operationalized as categorical variables with mutually exclusive categories. Race and ethnicity data were collected in categories similar to those used in the U.S. Census. Chronic illness was defined as a respondent ever having been told by a doctor or health professional that he or she has diabetes, heart disease, chronic obstructive pulmonary disease, hypertension, cancer (other than skin cancer), depression, asthma, or arthritis. County MSA category and Primary Care HPSA status were obtained from the 2007 Area Resource File.

We estimated seven regression models. In the first five regressions—one for each of the five individual access dimensions—the dependent variable was whether the respondent reported a barrier in that dimension that led to unmet need or delayed care in the previous 12 months. The dependent variable in the sixth regression was whether the respondent reported a barrier that led to unmet need or delayed care in any *nonfinancial* dimension. In the seventh regression, we sought to estimate associations between predictor variables and *nonfinancial* barriers that led to unmet need or delayed care among adults with *affordability* barriers. The dependent variable in this case was also respondent report of a barrier that led to unmet need or delayed care in any *nonfinancial* dimension. For all seven regressions, estimated parameters

are reported as adjusted prevalences where all other predictor variables are fixed at their mean values (Graubard and Korn 1999).² Stata 11 was used for all statistical analyses (StataCorp 2009).

Sensitivity Analysis

We conducted a sensitivity analysis to test the robustness of our estimates of the prevalence of barriers in each access dimension to our classification of reasons for unmet need or delayed care by reassigning reasons that could be classified into more than one access dimension to their next most plausible dimension. For example, we reclassified “doctor or hospital wouldn’t accept health insurance” as an *affordability* barrier; “had to wait in the office or clinic too long” as an *availability* barrier; “couldn’t get appointment soon enough” as an *accommodation* barrier; and “caring for family members” as no access barrier at all. After each reclassification, we then re-estimated the prevalence of barriers for each access dimension and the *nonfinancial* measure.

RESULTS

Prevalence of Barriers That Led to Unmet Need or Delayed Care in Each Access Dimension

Table 1 shows the characteristics of the sample. Among these adults, 29.0 percent experienced unmet need or delayed care in the previous 12 months. Table 2 presents the estimated unadjusted prevalences of reasons for unmet need or delayed care and their correspondence to one of the five access dimensions. Table 3 shows the estimated unadjusted prevalences of barriers that led to unmet need or delayed care in each of the five access dimensions. Among all adults, barriers in the *affordability* dimension were the most common reasons for unmet need or delayed care (18.5 percent). However, 17.5 percent of adults experienced an *accommodation* barrier that led to unmet need or delayed care and 8.4 percent experienced an *availability* barrier. Overall, barriers in any *nonfinancial* dimension (21.0 percent) were more frequent reasons for unmet need or delayed care in the previous 12 months than *affordability* barriers. These estimates were robust to reassignment of reasons that could be classified into more than one access dimension to their next most plausible dimension.³

Table 1: Sample Characteristics ($n = 15,197$)

<i>Characteristic</i>	<i>Percent (95% CI)</i>
Age	
18–25 years old	14.0 (13.0–15.1)
26–39 years old	24.7 (23.5–25.9)
40–54 years old	29.7 (28.6–30.8)
≥ 55 years old	31.6 (30.5–32.7)
Gender	
Female	51.8 (51.0–52.6)
Male	48.2 (47.4–49.0)
Race/ethnicity	
White non-Hispanic	68.5 (67.0–70.0)
African American non-Hispanic	11.9 (10.8–13.1)
Hispanic	13.7 (12.5–15.0)
Other non-Hispanic	5.8 (5.2–6.5)
U.S. citizenship status	
Citizen	91.8 (90.8–92.7)
Noncitizen	8.2 (7.3–9.2)
Education	
College or greater	25.8 (24.8–26.8)
High school	58.6 (57.4–59.8)
Less than high school	15.6 (14.5–16.7)
Household income	
<\$50,000	48.9 (47.4–50.4)
\$50,000 to < \$100,000	31.8 (30.4–33.2)
≥ \$100,000	19.3 (18.2–20.5)
Employment	
Not working	43.8 (42.7–45.0)
Part-time	16.8 (16.0–17.7)
Full-time	39.4 (38.3–40.4)
Marital status	
Married	64.0 (62.6–65.4)
Single	36.0 (34.6–37.4)
Parental status	
Parent	41.3 (39.8–42.7)
No children	58.7 (57.3–60.2)
Insurance status	
Medicare	19.5 (18.6–20.4)
Private health insurance	55.6 (54.2–56.9)
Medicaid	7.0 (6.3–7.8)
Military	1.5 (1.2–1.8)
Uninsured	16.4 (15.2–17.8)
Chronic condition*	
≥ 1 chronic illness	54.4 (53.1–55.6)
None	45.6 (44.4–46.9)
Health status	

Continued

Table 1. *Continued*

<i>Characteristic</i>	<i>Percent (95% CI)</i>
Fair or poor	20.8 (19.8–21.9)
Good/very good/excellent	79.2 (78.1–80.2)
County metropolitan statistical area category	
Not statistical area	6.0 (5.4–6.7)
Micropolitan	9.1 (8.2–10.0)
Metropolitan	84.9 (83.8–86.0)
U.S. Census region	
Northeast	16.9 (16.0–18.0)
Midwest	23.1 (21.9–24.3)
South	36.9 (35.4–38.5)
West	23.1 (21.8–24.4)
County primary care health professional shortage area status	
None of county	16.9 (15.9–18.0)
Part of county	39.6 (38.1–41.1)
All of county	43.5 (42.0–45.0)
Access problems	
Unmet need	10.0 (9.2–10.8)
Delayed care	26.8 (25.7–28.0)
Unmet need or delayed care	29.0 (27.8–30.1)

*Ever told by a doctor or health professional that has diabetes, heart disease, chronic obstructive pulmonary disease, hypertension, cancer (other than skin cancer), depression, asthma, or arthritis.

Prevalence of Nonfinancial Barriers among Adults with Affordability Barriers That Led to Unmet Need or Delayed Care

Two-thirds of adults (66.8 percent) who experienced an *affordability* barrier that led to unmet need or delayed care in the previous 12 months also experienced a *nonfinancial* barrier (Table 3). Among adults with *affordability* barriers, coexistent *accommodation* (54.3 percent) and *availability* (28.6 percent) barriers were more frequent than *acceptability* (18.6 percent) and *accessibility* (15.6 percent) barriers.

Adjusted Prevalences of Barriers That Led to Unmet Need or Delayed Care in Each Access Dimension

Our estimated adjusted prevalences of barriers in each access dimension varied by individual characteristics (Table 4). For example, there were statistically significant age group differences in prevalences of barriers that led to

Table 2: Estimated Unadjusted Prevalence of Reasons for Unmet Need or Delayed Care among U.S. Adults, by Access Dimension ($n = 15,197$)

<i>Reason for Unmet Need or Delayed Care*</i>	<i>Estimated Prevalence, % (SE)</i>
<i>Affordability</i>	
Worried about the cost	17.0 (0.5)
Health plan wouldn't pay for the treatment	6.9 (0.4)
<i>Accommodation</i>	
Too busy with work or other commitments to take the time	13.9 (0.4)
Couldn't get there when the doctor's office or clinic was open	7.0 (0.3)
Couldn't get through on the telephone	3.9 (0.3)
Had to wait in the office or clinic too long	0.3 (0.1)
Couldn't get off work	0.1 (0.04)
Caring for family members	0.05 (0.02)
<i>Availability</i>	
Couldn't get an appointment soon enough	8.2 (0.4)
Didn't know where to go/couldn't find doctor/couldn't use doctor of choice	0.3 (0.05)
<i>Accessibility</i>	
Took too long to get to the doctor's office or clinic from house or work	4.2 (0.3)
Transportation problems	0.4 (0.1)
<i>Acceptability</i>	
Doctor or hospital wouldn't accept health insurance	3.8 (0.2)
Negative attitudes with doctors, or bad experiences in getting care	0.2 (0.04)

*Respondents could list multiple reasons for why they experienced unmet need or delayed care, even within the same access dimension.

unmet need or delayed care in each access dimension. As compared with adults age 55 or older, adults in all of the younger age groups had higher prevalences of *nonfinancial* barriers ($p < .001$ for all comparisons). Relative to men, women had higher prevalences of *accommodation* (17.4 percent versus 14.5 percent, $p = .001$) and *availability* (8.5 percent versus 5.9 percent, $p < .001$). Non-African American, non-Hispanic minorities had higher prevalences of *availability* (10.9 percent versus 6.6 percent, $p = .006$) and *acceptability* (5.5 percent versus 2.7 percent, $p = .002$) barriers than did whites. African Americans had a higher prevalence of *accessibility* barriers than whites (4.8 percent versus 2.9 percent, $p = .02$).

There were also significant differences in adjusted prevalences of barriers in each access dimension based on household characteristics. Adults

Table 3: Estimated Unadjusted Prevalence of Barriers That Led to Unmet Need or Delayed Care among U.S. Adults, by Access Dimension

Access Dimension	Estimated Prevalence, % (SE)	
	All Adults (n = 15,197)	Adults with an Affordability Barrier* (n = 2,169)
Affordability	18.5 (0.5)	
Accommodation	17.5 (0.5)	54.3 (1.5)
Availability	8.4 (0.4)	28.6 (1.4)
Accessibility	4.4 (0.3)	15.6 (1.2)
Acceptability	4.0 (0.3)	18.6 (1.2)
Nonfinancial†	21.0 (0.5)	66.8 (1.4)

*Any *affordability* barrier that led to unmet need or delayed care in the previous 12 months.

†Any *accommodation, availability, accessibility, or acceptability* barrier that led to unmet need or delayed care in the previous 12 months.

from households with the lowest yearly income level (below \$50,000) had a higher prevalence of *affordability* (19.3 percent versus 10.0 percent, $p < .001$) and *nonfinancial* (21.2 percent versus 16.5 percent, $p = .001$) barriers than adults from the highest income households. Part-time workers had a higher prevalence of *accommodation* barriers than non-workers (18.2 percent versus 14.2 percent, $p = .002$). Parents were more likely to report *accommodation* barriers than adults without children (18.3 percent versus 14.6 percent, $p = .001$).

There were multiple differences in prevalences of barriers by insurance coverage. Adults who were uninsured or had private, Medicaid, or military coverage had significantly higher prevalences of *nonfinancial* barriers than those with Medicare. Individuals with private insurance, Medicaid, or military insurance had higher prevalences of *availability* barriers than Medicare enrollees. As compared with Medicare enrollees, adults with military coverage had a higher prevalence of *accessibility* barriers (11.1 percent versus 3.2 percent, $p = .003$).

Adults with health problems had relatively high prevalences of barriers in each access dimension. Those with at least one chronic illness had a higher prevalence of *nonfinancial* barriers than adults without a chronic illness (24.3 percent versus 14.7 percent, $p < .001$). Adults who reported fair or poor health status had a higher prevalence of *nonfinancial* barriers than those with better health status (29.0 percent versus 17.4 percent, $p < .001$).

Table 4: Estimated Adjusted Prevalences of Barriers That Led to Unmet Need or Delayed Care among U.S. Adults, by Access Dimension (*n* = 15,197)

Characteristic	Affordability Percent (95% CI)	Accommodation Percent (95% CI)	Availability Percent (95% CI)	Accessibility Percent (95% CI)	Acceptability Percent (95% CI)	Nonfinancial† Percent (95% CI)
Age						
18–25 years old	16.6 (13.7–19.4)**	19.4 (16.1–22.6)***	10.0 (7.6–12.4)***	4.3 (2.7–5.8)**	3.2 (2.1–4.3)	23.5 (20.1–26.8)***
26–39 years old	19.3 (17.0–21.6)***	19.5 (17.2–21.8)***	9.3 (7.7–10.8)***	3.8 (2.8–4.9)*	4.0 (2.8–5.1)**	23.2 (20.7–25.6)***
40–54 years old	17.4 (15.6–19.1)***	16.5 (14.9–18.1)**	8.0 (6.7–9.2)***	3.9 (3.0–4.8)**	3.8 (3.0–4.6)**	20.8 (19.0–22.7)***
≥ 55 years old‡	11.9 (10.3–13.6)	12.2 (10.6–13.8)	4.4 (3.4–5.4)	2.1 (1.4–2.9)	2.1 (1.5–2.7)	14.5 (12.8–16.3)
Gender						
Female	18.3 (17.0–19.6)***	17.6 (16.3–18.9)**	8.5 (7.6–9.4)***	3.1 (2.5–3.7)	3.0 (2.5–3.5)	21.6 (20.2–23.0)***
Male‡	13.3 (12.1–14.6)	14.5 (13.2–15.8)	5.9 (5.1–6.7)	3.4 (2.8–4.1)	3.2 (2.6–3.8)	17.4 (16.0–18.8)
Race/ethnicity						
White non-Hispanic (NH)‡	16.6 (15.3–17.8)	15.8 (14.7–16.9)	6.6 (5.9–7.3)	2.9 (2.4–3.4)	2.7 (2.3–3.2)	19.2 (18.0–20.4)
African American NH	11.5 (9.3–13.7)***	14.6 (11.8–17.5)	7.9 (5.8–9.9)	4.8 (3.0–6.5)*	3.5 (2.2–4.8)	17.6 (14.6–20.6)
Hispanic	14.2 (11.1–17.2)	17.6 (14.3–20.9)	7.8 (5.6–10.0)	3.3 (1.9–4.7)	4.0 (2.5–5.5)	21.0 (17.4–24.6)
Other NH	21.2 (16.7–25.7)*	18.8 (14.9–22.7)	10.9 (7.1–14.7)**	4.7 (2.6–6.8)	5.5 (3.3–7.7)**	24.3 (19.8–28.7)*
Household income						
<\$50,000	19.3 (17.7–20.9)***	17.2 (15.7–18.7)*	7.5 (6.5–8.6)	3.5 (2.9–4.1)	3.7 (2.9–4.4)*	21.2 (19.6–22.8)**
\$50,000 to <\$100,000	14.9 (13.2–16.7)***	15.5 (13.9–17.1)	7.0 (5.9–8.2)	3.0 (2.2–3.8)	2.8 (2.2–3.4)	19.0 (17.1–20.9)
≥ \$100,000‡	10.1 (8.5–11.7)	14.3 (12.4–16.2)	6.3 (4.9–7.6)	3.0 (2.0–4.0)	2.4 (1.7–3.2)	16.5 (14.5–18.5)
Employment						
Not working‡	16.4 (14.9–17.9)	14.2 (12.7–15.6)	7.3 (6.3–8.3)	3.8 (3.1–4.5)	3.8 (3.0–4.6)	18.4 (16.9–20.0)
Part-time	18.1 (15.8–20.4)	18.2 (16.0–20.5)**	7.3 (5.8–8.8)	2.9 (1.8–4.0)	4.1 (2.8–5.4)	21.3 (18.9–23.7)*
Full-time	14.2 (12.7–15.6)*	17.4 (15.7–19.1)**	6.8 (5.8–7.9)	2.9 (2.1–3.6)	2.2 (1.7–2.7)**	19.9 (18.1–21.7)

Continued

Table 4. Continued

Characteristic	Affordability Percent (95% CI)	Accommodation Percent (95% CI)	Availability Percent (95% CI)	Accessibility Percent (95% CI)	Acceptability Percent (95% CI)	Nonfinancial ^f Percent (95% CI)
Parental status						
Parent	18.4 (16.5–20.3)**	18.3 (16.6–20.0)**	7.4 (6.2–8.6)	4.1 (3.2–5.0)*	3.6 (2.8–4.3)	22.1 (20.2–24.0)**
No children [†]	14.1 (12.9–15.4)	14.6 (13.4–15.8)	6.9 (6.0–7.8)	2.8 (2.2–3.3)	2.8 (2.3–3.4)	17.9 (16.5–19.2)
Insurance status						
Medicare [‡]	7.4 (6.0–8.7)	9.3 (7.6–10.9)	4.7 (3.4–6.0)	3.2 (2.0–4.4)	2.6 (1.8–3.4)	11.9 (10.1–13.7)
Private health insurance	15.8 (14.4–17.3)***	18.6 (17.1–20.2)***	8.3 (7.2–9.3)**	3.1 (2.5–3.8)	3.2 (2.6–3.9)	22.1 (20.5–23.8)***
Medicaid	13.8 (9.7–17.9)***	18.1 (14.0–22.3)***	8.4 (5.9–11.0)**	4.7 (2.1–7.3)	4.5 (2.8–6.1)*	22.7 (17.7–27.7)***
Military	11.3 (3.8–18.7)	18.6 (9.9–27.2)**	11.1 (3.2–19.0)*	11.1 (2.6–19.6)**	1.1 (0.0–2.4)	21.6 (13.0–30.2)**
Uninsured	35.6 (31.9–39.4)***	17.1 (14.0–20.1)***	6.2 (4.6–7.9)	2.9 (1.7–4.0)	3.2 (2.0–4.4)	20.6 (17.4–23.8)***
Chronic condition [§]						
≥ 1 chronic illness	21.0 (19.5–22.5)***	20.0 (18.5–21.4)***	9.2 (8.2–10.1)***	4.1 (3.5–4.8)**	4.1 (3.4–4.8)***	24.3 (22.8–25.8)***
None [†]	10.9 (9.7–12.1)	12.2 (11.0–13.5)	5.2 (4.4–6.0)	2.4 (1.8–3.1)	2.2 (1.7–2.7)	14.7 (13.4–16.1)
Health status						
Fair or poor	23.3 (20.6–26.0)***	22.4 (19.7–25.1)***	12.4 (10.0–14.7)***	6.7 (5.1–8.2)***	5.5 (4.2–6.8)***	29.0 (26.0–31.9)***
Good/very good/excellent [†]	14.1 (13.1–15.1)	14.6 (13.6–15.6)	6.1 (5.5–6.7)	2.7 (2.2–3.1)	2.7 (2.2–3.1)	17.4 (16.3–18.5)
County MSA category [¶]						
Not statistical area	17.7 (13.7–21.6)	16.3 (12.8–19.9)	6.2 (4.1–8.3)	5.1 (2.9–7.2)	1.5 (0.7–2.3)**	19.5 (15.7–23.3)
Metropolitan [†]	16.9 (14.3–19.5)	17.9 (14.7–21.2)	7.8 (5.8–9.9)	4.5 (2.8–6.3)	3.9 (2.4–5.4)	21.0 (17.8–24.1)
Metropolitan	15.5 (14.5–16.5)	15.8 (14.8–16.8)	7.1 (6.4–7.8)	3.0 (2.6–3.5)	3.2 (2.8–3.6)	19.3 (18.3–20.4)

Continued

Table 4. Continued

Characteristic	Affordability Percent (95% CI)	Accommodation Percent (95% CI)	Availability Percent (95% CI)	Accessibility Percent (95% CI)	Acceptability Percent (95% CI)	Nonfinancial [†] Percent (95% CI)
U.S. census region						
Northeast [‡]	13.2 (11.5–15.0)	14.7 (12.7–16.7)	6.9 (5.6–8.1)	3.0 (2.1–3.8)	3.6 (2.6–4.6)	17.6 (15.5–19.7)
Midwest	14.5 (12.8–16.1)	13.7 (12.1–15.4)	6.0 (4.9–7.0)	2.7 (1.9–3.4)	2.9 (2.1–3.7)	16.6 (14.9–18.3)
South	16.7 (15.1–18.3)**	16.3 (14.7–17.9)	6.4 (5.4–7.5)	2.7 (2.1–3.4)	2.7 (2.1–3.3)	19.9 (18.1–21.6)
West	17.7 (15.1–20.2)**	19.4 (17.1–21.7)**	10.1 (8.5–11.7)**	5.5 (3.8–7.2)**	3.7 (2.7–4.7)	23.7 (21.1–26.3)***

Notes: Prevalences adjusted for all variables in table in addition to education, marital status, U.S. citizenship, and county Primary Care Health Professional Shortage Area status.

[†]Any accommodation, availability, accessibility, or acceptability barrier that led to unmet need or delayed care.

[‡]Reference group in multivariable logistic regression models.

[§]Ever told by a doctor or health professional that has diabetes, heart disease, chronic obstructive pulmonary disease, hypertension, cancer (other than skin cancer), depression, asthma, or arthritis.

[¶]County Metropolitan Statistical Area category.

* $p < .05$.

** $p < .01$

*** $p < .001$.

Adjusted Prevalence of Nonfinancial Barriers among Adults with Affordability Barriers That Led to Unmet Need or Delayed Care

Most adults with *affordability* barriers that led to unmet need or delayed care also experienced *nonfinancial* barriers (Table 5). As with all adults, there were differences in the adjusted prevalence of *nonfinancial* barriers among those with *affordability* barriers. While the size of the difference in the adjusted prevalence for various population groups changed, the direction of most of the differences mirrored those found in Table 4.4. As before, all of those in the younger age groups had a higher adjusted prevalence of *nonfinancial* barriers than adults age 55 and older. Hispanic adults had a higher prevalence than white adults (80.7 percent versus 64.7 percent, $p = .002$). Both part-time workers (76.0 percent versus 63.2 percent, $p < .001$) and full-time workers (72.3 percent versus 63.2 percent, $p = .01$) had higher prevalences than those who were not working. Men had a higher prevalence than women (73.1 percent versus 66.5 percent, $p = .02$). Adults with at least one chronic illness had a higher prevalence than those without a chronic illness (71.3 percent versus 65.1 percent, $p = .04$) and those in fair or poor health had a higher prevalence than those in better health (74.3 percent versus 66.6 percent, $p = .03$).

DISCUSSION

We found that *nonfinancial* barriers were more common reasons for unmet need or delayed care among U.S. adults than *affordability* barriers. Furthermore, most adults who experienced *affordability* barriers that led to unmet need or delayed care also experienced *nonfinancial* barriers. To our knowledge, this is the first study to identify the population prevalence of *nonfinancial* barriers among U.S. adults and quantify the multidimensional access challenges faced by adults who have difficulty affording health care.

The relatively high prevalence of *nonfinancial* barriers that lead to unmet need or delayed care calls into question whether improved affordability of care through PPACA will translate into actual population-level improvements in access without concurrent efforts to reduce *nonfinancial* barriers. A cautionary tale of how *nonfinancial* barriers could potentially limit the impact of insurance coverage expansions may be found in Massachusetts, often considered the model legislation for the coverage expansions created in PPACA. Two years after the implementation of health reform in that state, insurance coverage had increased but access to a personal doctor had not

Table 5: Estimated Adjusted Prevalence of *Nonfinancial* Barriers[†] among U.S. Adults with *Affordability* Barriers That Led to Unmet Need or Delayed Care (*n* = 2,169)

<i>Characteristic</i>	<i>Percent (95% CI)</i>
Age	
18–25 years old	78.9 (72.5–85.3)***
26–39 years old	71.5 (66.5–76.4)**
40–54 years old	67.9 (63.2–72.6)*
≥ 55 years old [‡]	59.7 (53.4–66.1)
Gender	
Female	66.5 (62.8–70.1)*
Male [‡]	73.1 (69.1–77.2)
Race/ethnicity	
White non-Hispanic [‡]	64.7 (61.2–68.2)
African American non-Hispanic	71.0 (61.9–80.1)
Hispanic	80.7 (73.3–88.1)**
Other non-Hispanic	75.4 (65.9–84.9)
Household income	
<\$50,000	67.7 (64.0–71.4)
\$50,000 to <\$100,000	71.9 (66.8–77.0)
≥ \$100,000 [‡]	70.5 (63.3–77.7)
Employment	
Not working [‡]	63.2 (58.7–67.7)
Part-time	76.0 (70.8–81.2)***
Full-time	72.3 (67.5–77.0)*
Parental status	
Parent	70.8 (66.3–75.3)
No children [‡]	67.8 (63.7–71.8)
Insurance status	
Medicare [‡]	78.4 (72.6–84.1)
Private health insurance	75.4 (71.7–79.1)
Medicaid	82.0 (73.6–90.5)
Military	92.2 (82.4–100.0)
Uninsured	50.9 (45.1–56.7)***
Chronic condition [§]	
≥ 1 chronic illness	71.3 (67.8–74.9)*
None [‡]	65.1 (60.3–69.9)
Health status	
Fair or poor	74.3 (69.1–79.4)*
Good/very good/excellent [‡]	66.6 (63.1–70.1)
Statistical Area category	
Not statistical area	64.6 (55.4–73.8)
Micropolitan [‡]	67.7 (60.9–74.4)
Metropolitan	69.9 (66.8–73.0)

Continued

Table 5. Continued

Characteristic	Percent (95% CI)
U.S. census region	
Northeast [‡]	68.9 (62.4–75.4)
Midwest	62.7 (56.7–68.6)
South	70.4 (66.1–74.8)
West	72.8 (67.6–78.1)

Notes. Prevalences adjusted for all variables listed in table in addition to education, marital status, U.S. citizenship, and county Primary Care Health Professional Shortage Area status.

[†]Any accommodation, availability, accessibility, or acceptability barrier that led to unmet need or delayed care.

[‡]Reference group in multivariable logistic regression models.

[§]Ever told by a doctor or health professional that has diabetes, heart disease, chronic obstructive pulmonary disease, hypertension, cancer (other than skin cancer), depression, asthma, or arthritis.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

(Zhu et al. 2010). Nearly 40 percent of Massachusetts adults who were fully insured for the previous 12 months still faced at least one problem getting needed care during that time; barriers related to providers were more common in this group than barriers related to the affordability of care (Long and Phadera 2010).

Access problems in health systems that provide care with relatively few financial barriers have similarly centered on nonfinancial issues. In the Veterans Health Administration, for example, recent efforts to measure and improve access have largely focused on geographic barriers (Mooney et al. 2000; LaVela et al. 2004; West and Weeks 2006; Egede et al. 2009; Raza et al. 2009; Culpepper et al. 2010; Finegan et al. 2010) and wait times for appointments (Schall et al. 2004; Armstrong et al. 2005; Oliver 2007). In both Canada and the United Kingdom, primary care physicians perceive fewer patient problems with affording care, but greater difficulties with long waits for diagnostic tests and specialist appointments when compared with perceptions of U.S. primary care physicians (Schoen et al. 2009).

As financial barriers to care are reduced through implementation of PPACA, federal and state policy makers have important opportunities to address nonfinancial barriers experienced by U.S. adults by building directly on existing plans to reform the nation’s health care system. At the federal level, forthcoming accountable care organizations (ACOs) are intended to serve as a vehicle for improving the way health care is organized and

provided. While these new entities will focus mostly on improving the quality and cost of care (Berwick 2011), they could also ultimately be held accountable for advancing access to care for defined populations (Fisher and Shortell 2010). For example, the Centers for Medicare and Medicaid Services could require ACOs to measure, track, report, and reduce patient-reported access barriers as a prerequisite for sharing in Medicare savings. At the state level, health insurance exchanges offer a promising mechanism for reducing *nonfinancial* barriers to care. Policy makers in California recently required health maintenance organizations to provide outpatient appointments within a specified time frame (Timely Access 2010); other *nonfinancial* barriers could similarly be addressed through regulation of health insurance plans that participate in state exchanges.

At both levels of government, policy makers should prioritize efforts to address the most common type of *nonfinancial* issue that leads to unmet or delayed care among U.S. adults: *accommodation* barriers. These barriers could be lessened through both new models of health care and new ways of accepting patients into existing systems of care. One particularly promising new model is the patient-centered medical home, which will ideally offer a system designed to address the unique access barriers faced by the population it serves (Bechtel and Ness 2010; Rittenhouse, Thom, and Schmitt diel 2010). Another model that could be beneficial for working populations with relatively inflexible schedules is an onsite workplace clinic (Tu, Boukus, and Cohen 2010). Within existing systems of care, redistribution of resources and providers could also reduce *accommodation* barriers. For example, open access scheduling can reduce waiting times in primary care by better matching provider capacity with patient demands for appointments (Murray and Berwick 2003; Murray et al. 2003; Armstrong et al. 2005; Cameron, Sadler, and Lawson 2010). E-mail communications between patients and providers about simple concerns that may not merit a face-to-face visit could be utilized more frequently if health insurance plans were to consistently pay providers for these kinds of interactions (Boukus, Grossman, and O'Malley 2010). Provision of more after-hours outpatient health services could expand opportunities for individuals to receive timely care in a nonemergency department setting (Grol, Giesen, and van Uden 2006).

The second most common type of *nonfinancial* issue that leads to unmet need or delayed care among U.S. adults is *availability* barriers, which could be addressed through policy approaches that reorganize and increase the supply of certain providers. In the short term, expansion of shared medical appointments could allow more patients to receive routine primary care for

chronic illnesses (Bronson and Maxwell 2004; Watts et al. 2009; Bartley and Haney 2010). Other short-term approaches include raising payments to provider types who are currently in short supply and expanding the scope of practice for nurse practitioners and physician assistants in clinical areas where there are currently shortages (Pohl et al. 2010). Longer-term approaches include providing stronger incentives for clinicians to locate in underserved areas and reshaping medical education to prioritize the training of providers who are projected to be in short supply (Bodenheimer and Pham 2010).

Barriers in the two other *nonfinancial* dimensions—*accessibility* and *acceptability*—are less common reasons for unmet need or delayed care among U.S. adults, but they may remain important for certain subgroups. These barriers could also be addressed by policy makers in specific ways. *Accessibility* barriers could be reduced through expansion of both telemedicine and transportation services for patients who live far from health care providers (Roine, Ohinmaa, and Hailey 2001; Iezzoni, Killeen, and O’Day 2006; Schooley et al. 2010). *Acceptability* barriers could be addressed by requiring ample provider choice in plans participating in state health insurance exchanges and fully funding planned reimbursement increases to ensure diverse provider participation in Medicaid programs (Zuckerman et al. 2004).

Across all five access dimensions, tools for measuring patient health care experiences such as the Consumer Assessment of Healthcare Providers and Systems (CAHPS) could be expanded to detect specific population access barriers and help policy makers and consumers identify the plans that most effectively remove them (Weech-Maldonado et al. 2003). Furthermore, periodic health surveys such as the National Health Interview Survey and the Behavioral Risk Factor Surveillance System could incorporate questions that elicit the full range of respondents access problems so that the prevalence of and risk factors for all types of health care barriers can be tracked more effectively (Johnson, Blewett, and Davern 2010).

Our study has several limitations. First, these are self-reported, cross-sectional data subject to recall bias. However, patient self-reports offer unique information on barriers to care that is not captured in other measures that infer access from data such as provider supply or population sociodemographics. Second, we were unable to identify barriers related to other access measures because the 2007 HTHS dataset only provides respondents reasons for having had unmet need or delayed care. Third, the HTHS only asked respondents about health care barriers if they had experienced unmet need or delayed care in the previous 12 months. Consequently, all barriers we

identified were conditional on those barriers having led to unmet need or delayed care. As more individuals may have experienced barriers that did not lead to unmet need or delayed care, our estimates of the prevalence of different types of access barriers among U.S. adults may be underestimates of the true population prevalence of barriers in each dimension. Fourth, respondents were not asked to rank the relative importance of barriers that led to unmet need or delayed care, so in some cases we could be overstating the importance of barriers that were comparatively minor. However, the Penchansky and Thomas model conceptualizes access as a chain of dimensions that is only as strong as its weakest link, whereby true access is realized only when there are no barriers in any of the five dimensions. Finally, the U.S. economy has undergone significant changes since 2007 that could have potentially impacted the relative frequencies of financial and nonfinancial access barriers, although we are unable to determine whether this actually occurred.

Our findings add new and timely information on the importance of *non-financial* barriers as causes of unmet need or delayed care among U.S. adults. We found that *nonfinancial* barriers were more common reasons for unmet need or delayed care than *affordability* barriers and most adults who experienced *affordability* barriers that led to unmet need or delayed care also experienced *nonfinancial* barriers. These *nonfinancial* barriers present important opportunities for both policy makers and researchers to ensure that investments aiming to improve the affordability of health services for U.S. adults translate into actual advances in access to care.

ACKNOWLEDGMENTS

Joint Acknowledgment/Disclosure Statement: These contents do not represent the views of the Department of Veterans Affairs or the United States Government. This work was supported in part by a grant from the Brigham and Women's Hospital Department of Medicine Martin Solomon Medical Education Fund. Abstracts from this study were presented at the Society of General Internal Medicine Mid-Atlantic Regional Meeting in Baltimore, MD, on March 18, 2011 and the Society of General Internal Medicine 34th Annual Meeting in Phoenix, AZ, on May 6, 2011. An abstract from this study was also presented at the AcademyHealth Annual Research Meeting in Seattle, WA, on June 14, 2011. No other disclosures.

Disclosures: None.

Disclaimers: None.

NOTES

1. Reasons for unmet need or delayed care that were not assigned to an access dimension because they did not represent a defined barrier included “other problems related to health system”; “change in health insurance”; “other insurance-related problems”; “you didn’t think the problem was serious enough”; “too lazy, procrastinated, didn’t feel like it, don’t like to go to doctors”; “too sick”; and “can’t get referral from doctor.”
2. The “margins” command in Stata was used to obtain these marginal estimates, which are calculated from predictions from a fitted model at fixed values of specified covariates.
3. The estimated unadjusted prevalence for *acceptability* barriers decreased from 4.1 to 0.2 percent and the estimated unadjusted prevalence for *affordability* barriers increased from 18.5 to 19.0 percent when “doctor or hospital wouldn’t accept health insurance” was reclassified as an *affordability* barrier. The estimated prevalence for *availability* barriers decreased from 8.4 to 0.3 percent when “couldn’t get an appointment soon enough” was reclassified as an *accommodation* barrier and increased to 8.6 percent when “had to wait in the office or clinic too long” was reclassified as an *availability* barrier. In all reclassifications, *nonfinancial* barriers (20.2–21.0 percent) were more common than *affordability* barriers (18.5–18.9 percent) as reasons for unmet need or delayed care. Among adults who experienced an *affordability* barrier, the frequency of any coexisting *nonfinancial* barrier ranged from 62.9 percent to 66.8 percent.
4. The exceptions were between the different categories of insurance coverage and the different levels of household income.

REFERENCES

- Aday, L.A. 1975. “Economic and Noneconomic Barriers to the Use of Needed Medical Services.” *Medical Care* 13 (6): 447–56.
- Aday, L.A., and R. Andersen. 1974. “A Framework for the Study of Access to Medical Care.” *Health Services Research* 9 (3): 208–20.
- Ahmed, S.M., J.P. Lemkau, N. Nealeigh, and B. Mann. 2001. “Barriers to Healthcare Access in a Non-Elderly Urban Poor American Population.” *Health and Social Care in the Community* 9 (6): 445–53.
- Andersen, R.M.. 1995. “Revisiting the Behavioral Model and Access to Medical Care: Does it Matter?” *Journal of Health and Social Behavior* 36 (1): 1–10.
- Andersen, R., and J.F. Newman. 1973. “Societal and Individual Determinants of Medical Care Utilization in the United States.” *The Milbank Memorial Fund Quarterly Health and Society* 51 (1): 95–124.

- Armstrong, B., O. Levesque, J.B. Perlin, C. Rick, and G. Schectman. 2005. "Reinventing Veterans Health Administration: Focus on Primary Care." *Journal of Health-care Management* 50(6): 399–408.
- Barr, D.A., and S.F. Wanat. 2005. "Listening to Patients: Cultural and Linguistic Barriers to Health Care Access." *Family Medicine* 37 (3): 199–204.
- Bartley, K.B., and R. Haney. 2010. "Shared Medical Appointments: Improving Access, Outcomes, and Satisfaction for Patients with Chronic Cardiac Diseases." *Journal of Cardiovascular Nursing* 25 (1): 13–9.
- Bechtel, C., and D.L. Ness. 2010. "If You Build it, Will They Come? Designing Truly Patient-Centered Health Care." *Health Aff (Millwood)* 29 (5): 914–20.
- Berwick, D.M. 2011. "Launching Accountable Care Organizations—The Proposed Rule for the Medicare Shared Savings Program." *New England Journal of Medicine*.
- Bodenheimer, T., and H.H. Pham. 2010. "Primary Care: Current Problems and Proposed Solutions." *Health Aff (Millwood)* 29 (5): 799–805.
- Boukus, E.R., J.M. Grossman, and A.S. O'Malley. 2010. "Physicians Slow to E-Mail Routinely with Patients." *Issue Brief Cent Stud Health Syst Change* 134: 1–5.
- Bronson, D.L., and R.A. Maxwell. 2004. "Shared Medical Appointments: Increasing Patient Access without Increasing Physician Hours." *Cleveland Clinic Journal of Medicine* 71(5): 369–70, 72, 74 passim.
- Cameron, S., L. Sadler, and B. Lawson. 2010. "Adoption of Open-Access Scheduling in an Academic Family Practice." *Canadian Family Physician* 56 (9): 906–11.
- Clemans-Cope, L., C.D. Perry, G.M. Kenney, J.E. Pelletier, and M.S. Pantell. 2008. "Access to and Use of Paid Sick Leave Among Low-income Families with Children." *Pediatrics* 122 (2): e480–6.
- Colwill, J.M., J.M. Cultice, and R.L. Kruse. 2008. "Will Generalist Physician Supply Meet Demands of an Increasing and Aging Population?" *Health Aff (Millwood)* 27 (3): w232–41.
- Culpepper, W.J., 2nd, D. Cowper-Ripley, E.R. Litt, T.Y. McDowell, and P.M. Hoffman. 2010. "Using Geographic Information System Tools to Improve Access to MS Specialty Care in Veterans Health Administration." *Journal of Rehabilitation Research and Development* 47 (6): 583–91.
- Devoe, J.E., A. Baez, H. Angier, L. Krois, C. Edlund, and P.A. Carney. 2007. "Insurance + Access not Equal to Health Care: Typology of Barriers to Health Care Access for Low-Income Families." *Annals of Family Medicine* 5 (6): 511–8.
- Egede, L.E., C.B. Frueh, L.K. Richardson, R. Acierno, P.D. Mauldin, R.G. Knapp, and C. Lejuez. 2009. "Rationale and Design: Telepsychology Service Delivery for Depressed Elderly Veterans." *Trials* 10: 22.
- Fairbrother, G., G. Kenney, K. Hanson, and L. Dubay. 2005. "How do Stressful Family Environments Relate to Reported Access and Use of Health Care by Low-income Children?" *Medical Care Research and Review* 62 (2): 205–30.
- Finegan, M.S., J. Gao, D. Pasquale, and J. Campbell. 2010. "Trends and Geographic Variation of Potentially Avoidable Hospitalizations in the Veterans Health-Care System." *Health Services Management Research* 23 (2): 66–75.

- Fisher, E.S., and S.M. Shortell. 2010. "Accountable Care Organizations: Accountable for What, to Whom, and How." *Journal of the American Medical Association* 304 (15): 1715–6.
- Friedman, E.. 1994. "Money isn't Everything. Nonfinancial Barriers to Access." *Journal of the American Medical Association* 271 (19): 1535–8.
- Gold, M.. 1998. "Beyond Coverage and Supply: Measuring Access to Healthcare in Today's Market." *Health Services Research* 33(3 Pt 2): 625–52; discussion 81–4.
- Graubard, B.I., and E.L. Korn. 1999. "Predictive Margins with Survey Data." *Biometrics* 55 (2): 652–9.
- Grol, R., P. Giesen, and C. van Uden. 2006. "After-Hours Care in the United Kingdom, Denmark, and the Netherlands: New Models." *Health Aff (Millwood)* 25 (6): 1733–7.
- Iezzoni, L.L., M.B. Killeen, and B.L. O'Day. 2006. "Rural Residents with Disabilities Confront Substantial Barriers to Obtaining Primary Care." *Health Services Research* 41(4 Pt 1): 1258–75.
- Johnson, P.J., L.A. Blewett, and M. Davern. 2010. "Disparities in Public Use Data Availability for Race, Ethnic, and Immigrant Groups: National Surveys for Healthcare Disparities Research." *Medical Care*.
- Kullgren, J.T., and C.G. McLaughlin. 2010. "Beyond Affordability: The Impact of Nonfinancial Barriers on Access for Uninsured Adults in Three Diverse Communities." *Journal of Community Health* 35 (3): 240–8.
- LaVela, S.L., B. Smith, F.M. Weaver, and S.A. Miskevics. 2004. "Geographical Proximity and Health Care Utilization in Veterans with SCI&D in the USA." *Social Science and Medicine* 59 (11): 2387–99.
- Long, S.K., and L. Phadera. 2010. *Barriers to Obtaining Health Care among Insured Massachusetts Residents*. Boston, MA: Massachusetts Division of Health Care Finance and Policy.
- McLaughlin, C.G., and L. Wyszewianski. 2002. "Access to Care: Remembering Old Lessons." *Health Services Research* 37 (6): 1441–3.
- Mooney, C., J. Zwanziger, C.S. Phibbs, and S. Schmitt. 2000. "Is Travel Distance a Barrier to Veterans Use of VA Hospitals for Medical Surgical Care?" *Social Science and Medicine* 50 (12): 1743–55.
- Murray, M., and D.M. Berwick. 2003. "Advanced Access: Reducing Waiting and Delays in Primary Care." *Journal of the American Medical Association* 289 (8): 1035–40.
- Murray, M., T. Bodenheimer, D. Rittenhouse, and K. Grumbach. 2003. "Improving Timely Access to Primary Care: Case Studies of the Advanced Access Model." *Journal of the American Medical Association* 289 (8): 1042–6.
- Ngo-Metzger, Q., M.P. Massagli, B.R. Clarridge, M. Manocchia, R.B. Davis, L.I. Iezzoni, and R.S. Phillips. 2003. "Linguistic and Cultural Barriers to Care." *Journal of General Internal Medicine* 18 (1): 44–52.
- Oliver, A.. 2007. "The Veterans Health Administration: An American Success Story?" *Milbank Quarterly* 85 (1): 5–35.
- Pathman, D.E., T.C. Ricketts, 3rd, and T.R. Konrad. 2006. "How Adults Access to Outpatient Physician Services Relates to the Local Supply of Primary Care Physicians in the Rural Southeast." *Health Services Research* 41 (1): 79–102.

- Patient Protection and Affordable Care Act. 2010.
- Penchansky, R., and J.W. Thomas. 1981. "The Concept of Access: Definition and Relationship to Consumer Satisfaction." *Medical Care* 19 (2): 127–40.
- Pitts, S.R., E.R. Carrier, E.C. Rich, and A.L. Kellermann. 2010. "Where Americans get Acute Care: Increasingly, it's not at their Doctor's Office." *Health Aff (Millwood)* 29 (9): 1620–9.
- Pohl, J.M., C. Hanson, J.A. Newland, and L. Cronenwett. 2010. "Analysis & Commentary. Unleashing Nurse Practitioners Potential to Deliver Primary Care and Lead Teams." *Health Aff (Millwood)* 29 (5): 900–5.
- Probst, J.C., S.B. Laditka, J.Y. Wang, and A.O. Johnson. 2007. "Effects of Residence and Race on Burden of Travel for Care: Cross Sectional Analysis of the 2001 US National Household Travel Survey." *BMC Health Services Research* 7: 40.
- Raza, T., M. Joshi, R.M. Schapira, and Z. Agha. 2009. "Pulmonary Telemedicine—A Model to Access the Subspecialist Services in Underserved Rural Areas." *International Journal of Medical Informatics* 78 (1): 53–9.
- Rittenhouse, D.R., D.H. Thom, and J.A. Schmittdiel. 2010. "Developing a Policy-Relevant Research Agenda for the Patient-Centered Medical Home: A Focus on Outcomes." *Journal of General Internal Medicine* 25 (6): 593–600.
- Roine, R., A. Ohinmaa, and D. Hailey. 2001. "Assessing Telemedicine: A Systematic Review of the Literature." *Canadian Medical Association Journal* 165 (6): 765–71.
- Schall, M.W., T. Duffy, A. Krishnamurthy, O. Levesque, P. Mehta, M. Murray, R. Parlier, R. Petzel, and J. Sanderson. 2004. "Improving Patient Access to the Veterans Health Administration's Primary Care and Specialty Clinics." *Joint Commission Journal on Quality and Safety* 30 (8): 415–23.
- Schoen, C., R. Osborn, M.M. Doty, D. Squires, J. Peugh, and S. Applebaum. 2009. "A Survey of Primary Care Physicians in Eleven Countries, 2009: Perspectives on Care, Costs, and Experiences." *Health Aff (Millwood)* 28 (6): w1171–83.
- Schooley, B.L., T.A. Horan, P.W. Lee, and P.A. West. 2010. "Rural Veteran Access to Healthcare Services: Investigating the Role of Information and Communication Technologies in Overcoming Spatial Barriers." *Perspectives in Health Information Management* 7: 1f.
- StataCorp.. 2009. *Stata Statistical Software: Release 11*. College Station, TX: StataCorp LP.
- Strouse, R., B. Carlson, J. Hall, and K. Cybulski. 2009. *Household Survey Methodology Report, 2007 (Round Five)*. Washington, DC: Center for Studying Health System Change.
- Thomas, J.W., and R. Penchansky. 1984. "Relating Satisfaction with Access to Utilization of Services." *Medical Care* 22 (6): 553–68.
- Timely Access to Non-Emergency Health Care Services. Title 28. 2010. Sacramento, CA: C. D. o. M. H. Care.
- Tu, H.T., E.R. Boukus, and G.R. Cohen. 2010. "Workplace Clinics: A Sign of Growing Employer Interest in Wellness." *Research Briefs* 17: 1–16.
- Watts, S.A., J. Gee, M.E. O'Day, K. Schaub, R. Lawrence, D. Aron, and S. Kirsh. 2009. "Nurse Practitioner-Led Multidisciplinary Teams to Improve Chronic Illness Care: The Unique Strengths of Nurse Practitioners Applied to Shared

- Medical Appointments/Group Visits." *Journal of the American Academy of Nurse Practitioners* 21 (3): 167–72.
- Weech-Maldonado, R., L.S. Morales, M. Elliott, K. Spritzer, G. Marshall, and R.D. Hays. 2003. "Race/Ethnicity, Language, and Patients Assessments of Care in Medicaid Managed Care." *Health Services Research* 38 (3): 789–808.
- West, A., and W.B. Weeks. 2006. "Physical and Mental Health and Access to Care Among Nonmetropolitan Veterans Health Administration Patients Younger than 65 Years." *The Journal of Rural Health* 22 (1): 9–16.
- Yang, S., R.L. Zarr, T.A. Kass-Hout, A. Kourosh, and N.R. Kelly. 2006. "Transportation Barriers to Accessing Health Care for Urban Children." *Journal of Health Care for the Poor and Underserved* 17 (4): 928–43.
- Zhu, J., P. Brawarsky, S. Lipsitz, H. Huskamp, and J.S. Haas. 2010. "Massachusetts Health Reform and Disparities in Coverage, Access and Health Status." *Journal of General Internal Medicine*. 25: 1356–62
- Zuckerman, S., J. McFeeters, P. Cunningham, and L. Nichols. 2004. "Changes in Medicaid Physician Fees, 1998–2003: Implications for Physician Participation." *Health Aff (Millwood)* Suppl Web Exclusives: W4–374–84.

SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article:

Appendix SA1: Author Matrix.

Please note: Wiley-Blackwell is not responsible for the content or functionality of any supporting materials supplied by the authors. Any queries (other than missing material) should be directed to the corresponding author for the article.